

## News/What to Watch For:

There is still time to collect foliage for nutrient analysis by the USU Analytical Lab ([www.usual.usu.edu](http://www.usual.usu.edu))

Protect peaches from late season **coryneum blight** infection (shown at right) if rain is predicted.

- Backyard growers, apply fungicide before rain; use Captan or Spectracide Immunox
- Commercial growers can find a list on page 3



## JUST THE BASICS: Current Treatments

### APPLE & PEAR

- Continue protecting fruit from *codling moth* through Sept. 15.

- Continue protecting lower trunk from *greater peachtree borer* through early October.


### PEACH/NECTARINE


- Continue protecting fruit from *peach twig borer* through Sept. 15.

### WALNUT

- Continue protecting walnuts from *walnut husk fly* until 1 month before harvest.

## Insect and Disease Information

 : information for residential settings

 : information for commercial orchards

### APPLE & PEAR

#### Bitter Pit on Apple

**Hosts:** apple

Bitter pit is a physiological disorder of the fruit where circular, sunken brown lesions form on the skin, mostly concentrated on the calyx end of the fruit.

Food and water conducting cells near the skin become adversely affected a few weeks before harvest, causing cells to gradually die. Sometimes symptoms are not seen until several weeks after harvest. In storage, bitter pit develops more rapidly at 50°F than at 32°. Symptoms will continue to develop further, especially on immature fruits, after removal from storage.

The incidence of bitter pit is determined by orchard conditions. The primary contributing factor is when watering is irregular throughout the growing season, particularly when

**Bitter pit symptoms are circular brown lesions closer to the bottom of the fruit.**



soil is drier early in the season and wet later. Bitter pit is also increased by heavy application of nitrogen fertilizer, heavy pruning, disruption of tree roots, or any situation which causes water competition between the leaves and fruits.

## Insect and Disease Information, continued from previous page

### Bitter pit, continued

#### Treatment Options:

If bitter pit has been a nagging problem in your orchard and you have not applied calcium yet, consider 1-2 calcium sprays on expanding fruit before harvest (target the fruit, not the foliage).

In some studies, calcium in the form of calcium nitrate has shown to work better when applied as late sprays (do not spray at temps above 80-85°F). Avoid spraying Crispin and Golden Delicious with calcium nitrate, since fruit damage may result.

After harvest, a 4% calcium chloride dip is also effective. (Store fruit immediately and wash before eating.)

For the best bitter pit prevention, an integrated approach of the following cultural practices is important:

- during irrigation season, avoid wide fluctuations in soil moisture
- do not over-fertilize to avoid vigorous growth and oversized fruit
- do not over-prune
- try to prevent biennial bearing through proper thinning and pollination practices
- harvest at optimal timing because immature, as well as late harvested fruit, is prone to bitter bit
- Calcium sprays, starting 1-2 weeks after bloom, and continuing monthly until harvest.

## PEACH/NECTARINE, APRICOT, CHERRY



### Brown Rot: Preventing Post-Harvest Decay

**Hosts:** peach/nectarine, plum

In the last few years, the disease brown rot (caused by the fungus *Monilinia*) has become more apparent in Utah, primarily in backyard trees but also in a few commercial orchards. It is one of the most important disease of stone fruit worldwide, but Utah's dry summers has kept it at bay. In late 2013 and in July and early August of 2014, northern Utah had heavy monsoonal rains that helped contribute to spread.

*Monilinia* thrives in warmer temperatures, but needs frequent rains during the pre-harvest period (when fruit has begun to soften) to cause disease. In some cases, 100% crop losses has occurred.

Fruit infections are visible as firm, brown lesions that rapidly spread throughout the fruit causing complete decay in just a few days. Spores produced on these fruit can then disperse

**Brown rot causes fruit to quickly mummify on the tree.**



and infect additional healthy fruit. Fruit that is picked can appear healthy, only to rot in storage or on store shelves. In parts of the country where brown rot is common, flowers and green fruit can become infected. But in Utah, we have found that the most common infections are occurring on ripe fruit. As fruit begins to ripen, it becomes susceptible to infection, and the risk increases each day closer to harvest.

Where rains are predicted, fungicide applications can begin 2 to 3 weeks before predicted harvest of each variety. A second application would occur 9 days later, and a final application the day before or between pickings.

Many fungicides have a 0 or 1-day PHI and a re-entry interval of 12-24 hours, making this timing possible. See the table on the next page for a list of options. It is important to rotate between pesticide classes to prevent resistance.

The final pre-harvest spray provides protection during the picking and transport process. It may also be very important for fresh farm market peaches, since these fruit are rarely treated with a post-harvest fungicide. If you have had brown rot identified this year or in the past, it will be important to apply a protectant fungicide to prevent infection, especially if rainfall occurs close to or at harvest.

*Brown Rot* is continued on next page

## Insect and Disease Information, continued from previous page

### Brown Rot, continued

Fungicide	Group	PHI	Also Controls	Efficacy	Resistance Risk
Topsin M (thiophanate-methyl)	1	1	powdery mildew	excellent	High
Elite (tebuconazole)	3	0	powdery mildew	excellent	High
Indar (fenbuconazole)	3	0	powdery mildew	excellent	High
Rally (myclobutanil)	3	0	powdery mildew	good	High
Spectracide Immunox (myclobutanil)	3	0	powdery mildew, coryneum blight (good)	good	High
Orbit (propiconazole)	3	0	powdery mildew	excellent	High
Fontelis (penthiopyrad)	7	0	coryneum blight, powdery mildew	good	High
Vanguard (cyprodinil)	9	2		good	High
Gem (trifloxystrobin)	11	1	coryneum blight, powdery mildew	good	High
Adament (tebuconazole + trifloxystrobin)	3/11	1	powdery mildew	excellent	Medium
Quilt Xcel (propiconazole + azoxystrobin)	3/11	0	coryneum blight, powdery mildew	excellent	Medium
Pristine (boscalid + pyraclostrobin)	7/11	0	coryneum blight, powdery mildew	excellent	Medium
Captan (captan)	M4	0	coryneum blight	fair	Low

### Pests of Ripening Peaches



**Hosts:** peach/nectarine

Some areas are harvesting early peach varieties now, which means that pests such as boxelder bugs, earwigs, and European paper wasps are starting to become a concern. One of the best tools for managing these pests is to harvest fruit quickly as it ripens, or even a touch before fully ripe. Keep an eye on the ripest peaches on the trees to see if any of these pests are becoming a concern.

Boxelder bugs feed with piercing-sucking mouthparts, and can cause fruit flesh to dry out or can introduce decay bacteria or fungi. Earwigs chew holes into fruit or enter fruit at the stem end, rendering fruit useless. Wasps usually seek out fruit that is already damaged, and suck out juices.

#### Treatment Options:

If there is a problem with large numbers of any of these pests or other pests of fruit during harvest, there are two insecticide options. Both options require contact with the target pest.

- pyrethrin (Prentox Pyronyl Crop Spray, Pyrellin, Pyganic, Fertilome Fruit Tree Spray, Natural Guard Neem Spray, etc.): 0-day PHI
- Sevin, 3-day PHI

Trapping is another option. Earwigs hide during the day, so trap them by using cardboard or rolled newspapers tucked in limb crotches. Another option is to apply Tanglefoot to duct tape wrapped around the tree trunk.



**boxelder bugs feed in clusters due to a pheromone that causes them to form large aggregations**



**earwigs often feed near the stem end where they can hide**

## Insect and Disease Information, continued from previous page

### Pests of Ripening Peaches, continued

To deal with European paper wasps, make a homemade trap by cutting the top third from a plastic soda bottle and inverting it into the bottom portion. Punch a hole on each side and tie on string for hanging. Add a mixture of 1 part fruit juice to 10 parts water plus 1 tsp liquid detergent to keep the wasps in the water. Adding a bit of ripened fruit will make it even more attractive.



## Production Information

### Effects of Heavy Crop Load on Fruit Trees

Maturing fruits place a heavy burden on trees, using much of the photosynthate produced by the tree. During harvest season, you can really see the effect of a heavy crop load. In spring, lots of fruit on the trees may look appealing, but it causes significant stress on tree growth that has consequences now and down the road. Proper management of crop load is essential for the right balance of growth and fruit production.

#### Apple, Peach/Nectarine, Pear, Plum

##### Effects at Harvest

The most obvious effect of a high crop load is the possibility of branches breaking under the heavy weight load. Trees can lose large scaffold limbs or can split down the middle. In high density plantings, a broken scaffold can reduce tree production capacity by up to 50%.

Fruit quality is also affected by a high crop load, which is financially hard for commercial growers. Fruit size is reduced, fruit does not color or ripen properly, fruit may be misshapen, fruit won't store as long, and taste may be affected due to lower concentration of sugars.

In spring, thinning fruit on peach/nectarine, apple, pear, and plum trees is necessary to provide good fruit quality. There is a substantial incentive to reduce crop load for increased fruit size since large fruit is almost always more valuable than small fruit in fresh market sales.



## Insect and Disease Information, continued from previous page

### *High Crop Load, continued*

#### **Effects the Following Year**

A manageable crop load promotes return bloom and maintains tree growth and structure. When apple trees in particular experience very heavy fruit production one year, they often have light production the following year, called biennial or alternate bearing. Honeycrisp is very prone to biennial bearing. The large amount of nutrients needed to develop a large fruit crop limits the resources available for next year's flower bud development. Reducing fruit during the heavy production years helps avoid the development of alternate bearing cycles.

On peaches and nectarines, branches straining under the weight of a too much fruit may lead to tiny cracks that are not visible to the naked eye, but serve as entry points for cytospora canker. If these small wounds escape infection, they will ooze a clear to amber sap the following season, further reducing the tree's reserves.

A high crop load on these trees also reduces shoot growth and the result is weaker limbs and shorter shoots for next year's flowers. After bloom, peaches should be hand-thinned, leaving about 10% of the fruit to get a good crop.

#### **Cherry**

Most growers manage crop load on cherries exclusively through pruning, so that fruit sizes and ripens properly. For the last several years, tart cherry trees in Utah have had high crop loads, with this year's crop being significantly high. This past spring, some growers conducted extra pruning during and after bloom in order to further reduce the crop load.



**Some tart cherry trees in Utah that had a heavy crop in 2013 and 2014 are in decline.**

A heavy fruit set on cherries leads to a high fruit-to-leaf area ratio that limits the amount of carbohydrate movement into the fruit, detrimentally affecting fruit size and ripening ability.

But just as important, it also affects the health of the tree. Resources are diverted away from tree growth and maintenance. In 2013 and 2014, some trees that already under stress from water or nutrition deficit or from pests such as powdery mildew or spider mites, and were not able to carry the load of the crop to harvest. Some growers applied supplemental phosphorus and potassium to improve fruit quality under high crop load conditions, as recommended based on USU research.

## Spray Timing Information - Codling Moth

Please check this table at each advisory as the information may change as the dates get closer. The forecasts use the average temperature for each site. Fruit should remain protected through each generation according to interval provided on your pesticide label. Many more locations can be viewed on the [Utah Climate Center TRAPs website](#) (select location; select codling moth).

### Codling Moth, Second and Third Generations

Apply treatments (the number of times depends on prior infestation), spaced 7-21 days apart (depending on material) to protect fruit up to the end of the second generation egg hatch. Time the last treatment to be 10-25 days (depending on the material) before the "End" date.

In general, starting with the 2nd generation, the fruit should be protected continuously until September 15, or just before harvest (whichever is earliest). Because of the hotter temperatures occurring during 2nd and 3rd generations, there is a very short "break" (about 3 days), and egg hatch occurs almost nonstop. In sites with lower populations or very little outside pressure, just apply a treatment during the period of greatest egg hatch.

County	Location	End 2nd Gen. Egg Hatch	Start Spray, 3rd Gen.	Keep Fruit Protected Up To:
<b>Box Elder</b>	Perry	August 19	August 21	Sept. 15
	Tremonton	August 21	August 23	Sept. 15
<b>Cache</b>	River Heights	September 5	September 8	Sept. 15
	Richmond	September 15	none	Sept. 15
<b>Carbon</b>	Price	August 26	August 29	Sept. 15
<b>Davis</b>	Kaysville	passed	August 16	Sept. 15
<b>Grand</b>	Castle Valley	passed	passed	Sept. 15
<b>Iron</b>	Cedar City	August 30	September 3	Sept. 15
<b>Juab</b>	Tintic	September 7	September 8	Sept. 15
<b>Salt Lake</b>	North Holladay	passed	passed	Sept. 15
	Taylorville	passed	passed	Sept. 15
<b>Sevier</b>	Monroe	passed	August 19	Sept. 15
<b>Tooele</b>	Erda	passed	August 19	Sept. 15
	Grantsville	passed	passed	Sept. 15
<b>Uintah</b>	Vernal Airport	August 26	August 29	Sept. 15
<b>Utah</b>	Alpine	September 2	September 5	Sept. 15
	American Fork	August 19	August 23	Sept. 15
	Genola	passed	August 19	Sept. 15
	Lincoln Point	August 20	August 23	Sept. 15
	Orem (Lindon)	August 20	August 23	Sept. 15
	Payson	August 19	August 22	Sept. 15
	Provo Airport	passed	August 20	Sept. 15
	Provo Canyon	August 26	August 28	Sept. 15
	Santaquin	August 19	August 22	Sept. 15
	Tickville	August 19	August 21	Sept. 15
West Mountain	August 26	August 29	Sept. 15	
<b>Weber</b>	Ogden Airport	passed	passed	Sept. 15
	Pleasant View	passed	passed	Sept. 15
<b>Wasatch</b>	Heber City	September 9	none	Sept. 9
<b>Washington</b>	New Harmony	passed	passed	Sept. 15
<b>Wayne</b>	Torrey	passed	passed	Sept. 15

## Spray Timing - Peach Twig Borer

### Peach Twig Borer, Second and Third Generations

The table below shows a range of dates for “apply spray” for each generation. Choose the earlier date if you have high pest pressure in your area (lots of damage last year), and choose the later date if you have low pest pressure (very little damage).

In general, one to two sprays per generation should suffice.

County	Location	Keep Fruit Protected Up To:	Apply Spray, 3rd Gen.	Keep Fruit Protected Up To:
<b>Box Elder</b>	Perry	August 20	September 1 - 8	Sept. 15
	Tremonton	August 25	September 7	Sept. 15
<b>Cache</b>	All Locations	September 7	none	Sept. 7
<b>Carbon</b>	Price	August 30	none	August 30
<b>Davis</b>	Kaysville	passed	August 28 - Sept. 2	Sept. 15
<b>Grand</b>	Castle Valley	passed	passed	Sept. 15
<b>Iron</b>	Cedar City	September 2	none	Sept. 2
<b>Juab</b>	Tintic	September 7	none	Sept. 7
<b>Salt Lake</b>	North Holladay	passed	August 17 - 21	Sept. 15
	Taylorville	passed	August 19 - 23	Sept. 15
<b>Sevier</b>	Monroe	August 19	August 30 - Sept. 6	Sept. 15
<b>Tooele</b>	Erda	passed	August 24 - 29	Sept. 15
	Grantsville	passed	August 19 - 24	Sept. 15
<b>Utah</b>	Alpine	September 9	none	Sept. 9
	American Fork	passed	August 30 - Sept. 4	Sept. 15
	Genola	passed	August 23 - 28	Sept. 15
	Lincoln Point	passed	August 27 - Sept. 1	Sept. 15
	Orem (Lindon)	August 20	August 27 - Sept. 4	Sept. 15
	Payson	passed	August 27 - Sept. 1	Sept. 15
	Provo Airport	passed	August 26 - 31	Sept. 15
	Provo Canyon	August 22	Sept. 2 - Sept. 8	Sept. 15
	Santaquin	passed	August 27 - Sept. 1	Sept. 15
	Tickville	August 20	Sept. 2 - 10	Sept. 15
West Mountain	August 24	Sept. 4 - 10	Sept. 15	
<b>Weber</b>	Pleasant View	passed	August 19 - 24	Sept. 15
<b>Wayne</b>	Torrey	passed	August 19 - 23	Sept. 15

## Spray Materials - Residential Applicators

Note that these treatments are only recommended if you know you have the particular pest in your trees. We recommend learning about specific pests, and scouting your trees at least once/week.

Target Pest	Host	Chemical	Example Brands	Comments
Codling moth	apple, pear	<i>Conventional</i> acetamiprid carbaryl gamma-cyhalothrin malathion  <i>Soft/organic</i> spinosad  codling moth virus	Ortho Fruit and Veg. Sevin, Bonide Fruit Tree Spray, etc. Spectracide Triazicide Malathion  Green Light, Gardens Alive Bull's Eye, Monterey Cyd-X	<b>acetamiprid:</b> every 14 days <b>carbaryl:</b> every 14 - 21 days <b>gamma-cyhalothrin:</b> every 14 days <b>malathion:</b> every 7 days <b>spinosad:</b> every 7 days <b>codling moth virus</b> can only be purchased online
Spider mites	all	<i>Soft/organic</i> oil (1%) insecticidal soap	Many products, EcoSmart Safer's, Bayer Natria, Bonide	<b>oil and soap:</b> allow 4 hours-time for application to dry before temps reach 85 or above.
Coryneum blight	peach, apricot	<i>Conventional</i> myclobutanil captan	Spectracide Immunox Captan	Use as a preventive before a rain.
Peach twig borer	peach, nectarine	<i>Conventional</i> acetamiprid carbaryl malathion permethrin  <i>Soft/organic</i> spinosad kaolin clay	Ortho Flower, Fruit & Veg Sevin, Bonide Fruit Tree Spray, etc. Malathion Hi-Yield Indoor/Outdoor Broad Use; Lilly Miller Multi-Purpose Insect Spray  see 'codling moth' above Surround	see comments under Codling Moth  <b>permethrin:</b> every 14 days; this ingredient is becoming less available in stores and may cause spider mite outbreaks  <b>Surround:</b> every 3-5 days; works to repel, not kill insects; only moderate control; must purchase online
Walnut husk fly	walnut peach apricot	<i>Conventional</i> acetamiprid carbaryl malathion  <i>Soft/organic</i> pyrethrin spinosad	Ortho Fruit & Veg. Sevin Malathion  Concern Multi-Purpose see above	start applications when fruit in sunniest locations develops a salmon blush  <b>spinosad:</b> every 7 days

**Precautionary Statement:** Utah State University Extension and its employees are not responsible for the use, misuse, or damage caused by application or misapplication of products or information mentioned in this document. All pesticides are labeled with ingredients, instructions, and risks. The pesticide applicator is legally responsible for proper use. USU makes no endorsement of the products listed herein.

### Tree Fruit IPM Advisory

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